GEORGIA INSTITUTE OF TECHNOLOGY — OFFICE OF CONTRACT ADMINISTRATION

# PROJECT ADMINISTRATION DATA SHEET

[X] ORIGINAL [ ] REVISION NO. ____

Project No. E-21-A01 (R6059-0A2) GTRC/~~EXX~~ DATE 10 /24 /85

Project Director: Gail Wells School/~~Lab~~ Electrical Engr.

Sponsor: Georgia Power Company

Type Agreement: Letter of Acceptance Task RP2 under BOA 95

Award Period: From 9/18/85 To ~~12/31/85~~ 7/30/87 (Performance) ~~12/31/85~~ 5-31-86 (Reports)

| Sponsor Amount: | This Change | Total to Date |
|---|---|---|
| Estimated: | $ 12,620 | $ 12,620 |
| Funded: | $ 12,620 | $ 12,620 |

Cost Sharing Amount: $ None Cost Sharing No: N/A

Title: Heat Pump Control Design

**ADMINISTRATIVE DATA** OCA Contact R. Dennis Farmer X4820

1) Sponsor Technical Contact:

Gary L. Birdwell
Georgia Power Company
333 Piedmont Avenue, NE (20th Floor)
Atlanta, Georgia 30308
526-7359

2) Sponsor Admin/Contractual Matters:

Same as 1)

Defense Priority Rating: N/A Military Security Classification: N/A

(or) Company/Industrial Proprietary: See Below

**RESTRICTIONS**

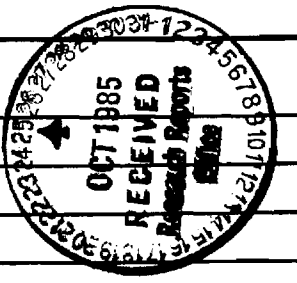
See Attached N/A Supplemental Information Sheet for Additional Requirements.

Travel: Foreign travel must have prior approval – Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed greater of $500 or 125% of approved proposal budget category.

Equipment: Title vests with Sponsor

**COMMENTS:**

A Non-Disclosure Agreement has been negotiated.




**COPIES TO:** SPONSOR'S I. D. NO. 02.256.000.86.003

Project Director
Research Administrative Network
Research Property Management
Accounting
Procurement/GTRI Supply Services
Research Security Services
Reports Coordinator (OCA)
Research Communications (2)
GTRC
Library
Project File
Other A. Jones

**GEORGIA INSTITUTE OF TECHNOLOGY** **OFFICE OF CONTRACT ADMINISTRATION**

## SPONSORED PROJECT TERMINATION/CLOSEOUT SHEET

Date November 23, 1987

Project No. E-21-A01 School/~~XXX~~ EE

Includes Subproject No.(s) N/A

Project Director(s) I. G. Wells GTRC / ~~XXX~~

Sponsor Georgia Power Company

Title Heat Pump Control Design

Effective Completion Date: 7/30/87 (Performance) 7/30/87 (Reports)

Grant/Contract Closeout Actions Remaining:

- [ ] None
- [x] Final Invoice or Final Fiscal Report
- [ ] Closing Documents
- [ ] Final Report of Inventions
- [ ] Govt. Property Inventory & Related Certificate
- [ ] Classified Material Certificate
- [ ] Other

Continues Project No. Continued by Project No.

COPIES TO:

Project Director
Research Administrative Network
Research Property Management
Accounting
Procurement/GTRI Supply Services
Research Security Services
Reports Coordinator (OCA) ✓
Legal Services

Library
GTRC
Research Communications (2)
Project File
Other Duane Hutchison
Angela DuBose
Russ Embry

FORM OCA 69.285

E-21-A01

GEORGIA INSTITUTE OF TECHNOLOGY
SCHOOL OF ELECTRICAL ENGINEERING
ATLANTA, GEORGIA 30332

TELEPHONE: (404) 894- 2961

September 11, 1986

Electric Power Research Institute
Attn: Management Performance Systems
3412 Hillview Avenue
P.O. Box 10412
Palo Alto, CA 94303

SUBJECT: EPRI Contract No. RP8001-4
Project Director - Dr. A. Rohatgi
Contractor Cost Performance Report

Dear Sirs:

Enclosed you will find a Contractor Cost Performance Report for the period August 1, 1986 - August 31, 1986 for the above referenced contract ("Basic Understanding of Carrier Lifetime Limiting Mechanisms in Silicon"). Should you have any questions, please do not hesitate to contact me at 404/894-2961.

Sincerely,

Cindy Meyer
Admin. Asst.

CM
Enclosure

cc: Dr. A. Rohatgi
Dr. Frank Goodman, EPRI

EPRI

CONTRACTOR COST PLAN

EPRI 177 8/84R

| EPRI CONTRACT NUMBER | EPRI DIVISION NUMBER | CONTRACTOR NAME, ADDRESS AND TELEPHONE NUMBER |
|---|---|---|
| RP 8001-04 | For EPRI Use Only | Georgia Institute of Technology<br>School of Electrical Engineering<br>Atlanta, GA 30332<br>(404) 894-2961 |
| EPRI PROJECT MANAGER<br>Name Frank Goodman | PERIOD OF PERFORMANCE<br>From 1/15/86 to 12/31/86 | |

**Note:**
- Instructions for completing this form are on the reverse side.
- All figures are to be shown in U.S. dollars—whole thousands only.
- Show EPRI portion of the contract only. Do not include contractor cost sharing.

| | Prior Year(s) Actual | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | (1) | | | | | | | | | | | |
| Actual (booked) cost in the current year 19 86 | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec. | Current Year Actual |
| | 0 | 0 | 0 | 0 | 2 | 2 | 18 | 21 | | | | | 43 (2) |
| Forecast to complete the current year 19 86 | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Current Year Forecast |
| | | | | | | | | | 16 | 16 | 16 | 17 | 65 (3) |
| Forecast to complete the future year(s) | 19 ___ | 19 ___ | 19 ___ | 19 ___ | Remaining Years(s) | Future Year(s) Forecast | | | | | | | |
| | | | | | | 0 (4) | | | | | | | |
| | | | | | Grand total of lines (1) + (2) + (3) + (4) | 108 | | | | | | | |

**Unbooked liability**

Please list dollar amount, description of cost, and month/year in which costs are expected to be booked.

**Remarks:** Comments on significant items

PREPARED BY

Print name Cindy Meyer

Title Administrative Assistant

EPRI

EPRI 177 8/84R

| EPRI CONTRACT NUMBER | EPRI DIVISION NUMBER | CONTRACTOR NAME, ADDRESS AND TELEPHONE NUMBER |
|---|---|---|
| RP 8001-04 | For EPRI Use Only | Georgia Institute of Technology<br>School of Electrical Engineering<br>Atlanta, GA 30332<br>(404) 894-2961 |
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**Note:**
- Instructions for completing this form are on the reverse side.
- All figures are to be shown in U.S. dollars—whole thousands only.
- Show EPRI portion of the contract only. Do not include contractor cost sharing.

| | Prior Year(s) Actual | |
|---|---|---|
| | 0 | (1) |

**Actual (booked) cost in the current year 19 86**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec. | Current Year Actual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 2 | 2 | 18 | 21 | | | | | 43 (2) |

**Forecast to complete the current year 19 86**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Current Year Forecast |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 16 | 16 | 16 | 17 | 65 (3) |

**Unbooked liability**

Please list dollar amount, description of cost, and month/year in which costs are expected to be booked.

**Forecast to complete the future year(s)**

| 19 ___ | 19 ___ | 19 ___ | 19 ___ | Remaining Years(s) | Future Year(s) Forecast |
|---|---|---|---|---|---|
| | | | | | 0 (4) |

Grand total of lines (1) + (2) + (3) + (4) 108

**Remarks: Comments on significant items**

PREPARED BY

Print name Cindy Meyer

Title Administrative Assistant

**GEORGIA POWER COMPANY GENERAL PURCHASING AGREEMENT**

**TECHNOLOGY DEVELOPMENT CENTER TASK STATEMENT - BOA 95 - TASK RP2**

**PROJECT NAME: Heat Pump Control Design**

**PRINCIPAL INVESTIGATOR: Gail Wells, Research Engineer**
**School of Electrical Engineering**

**FINAL STATUS REPORT: Fall Quarter 1985**

The purpose of this project was to design a control system for a new integrated HVAC system being developed by E-Tech, Inc., for Georgia Power. The controller is to be a self-contained unit which will be able to accept a variety of input signals and control all modes of the system. This report states the progress of the project to date and describes the work remaining to be done.

The first task was selection of an appropriate microcomputer chip for the heat pump controller. This decision was based mainly on the types of development systems that were available to support the microcomputer. Motorola had the most economic development system that would provide the basic requirements: a monitor/debugger program with downloading capabilities and a prom programmer. It is a single board evaluation module which supports the MC6801/68701. (The MC68701 is the prototyping counterpart to the MC6801; i.e., it has 2K of EPROM instead of ROM.) The assembly code for this microcomputer is upward compatible with the 6809. Since there is a 6809 cross-assembler that runs under AOS, the software for the heat pump controller can be written and assembled on the Data General ECLIPSE, then downloaded to the M68701EVM evaluation module for debugging.

The initial prototype is a very general purpose with only the immediate interface required for the TTL logic of the microcomputer. This will offer the greatest flexibility for interfacing to the HVAC system. It is antici-

pated that additional electronics, such as switching relays, for example, will be necessary to "customize" the prototype to the particular input characteristics of the E-Tech system. These additional electronics can be incorporated in later prototypes to provide more application oriented controllers.

One of the characteristics of the design is modularity. It consists of a microcomputer printed circuit board, an input circuit board with relay-to-TTL interface electronics, an output circuit board (TTL-to-relay), and different types of relay cards. The latter will provide such options as 5 or 12 vdc input control and a range of low level to moderate switching capability (1A to 16A). The electronic components for this prototype have been ordered and layouts for the circuit boards are in progress. These boards will be of the same size and all fit in a card cage arrangement. The attached table shows the functional elements of the design and the associated control logic.